

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

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| Applicant's or agent's file reference PHUS030447WO | FOR FURTHER ACTION | | See item 4 below |
| International application No. PCT/IB2004/052409 | International filing date (<i>day/month/year</i>) 12 November 2004 (12.11.2004) | Priority date (<i>day/month/year</i>) 17 November 2003 (17.11.2003) | |
| International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237 | | | |
| Applicant KONINKLIJKE PHILIPS ELECTRONICS, N.V. | | | |

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|---|---|-------------------------------|-------------------------------------|---------------------|--------------------------|--|-------------------------------------|---------------------------------------|-------------------------------------|---|--------------------------|------------------------------------|--------------------------|--|--------------------------|--|
| <ol style="list-style-type: none"> 1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 bis.1(a). 2. This REPORT consists of a total of 12 sheets, including this cover sheet. <p>In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.</p> | | | | | | | | | | | | | | | | |
| <ol style="list-style-type: none"> 3. This report contains indications relating to the following items: <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;"><input checked="" type="checkbox"/></td> <td style="width: 85%;">Box No. I Basis of the report</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>Box No. II Priority</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>Box No. IV Lack of unity of invention</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. VI Certain documents cited</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. VII Certain defects in the international application</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. VIII Certain observations on the international application</td> </tr> </table> 4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2). | <input checked="" type="checkbox"/> | Box No. I Basis of the report | <input checked="" type="checkbox"/> | Box No. II Priority | <input type="checkbox"/> | Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability | <input checked="" type="checkbox"/> | Box No. IV Lack of unity of invention | <input checked="" type="checkbox"/> | Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement | <input type="checkbox"/> | Box No. VI Certain documents cited | <input type="checkbox"/> | Box No. VII Certain defects in the international application | <input type="checkbox"/> | Box No. VIII Certain observations on the international application |
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| <input checked="" type="checkbox"/> | Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement | | | | | | | | | | | | | | | |
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| <input type="checkbox"/> | Box No. VIII Certain observations on the international application | | | | | | | | | | | | | | | |

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| <p>The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland</p> <p>Facsimile No. +41 22 740 14 35</p> | <p>Date of issuance of this report 22 May 2006 (22.05.2006)</p> <p>Authorized officer Cecile Chatel</p> <p>Telephone No. +41 22 338 70 60</p> |
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PATENT COOPERATION TREATY

REC'D 15 FEB 2005

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From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION See paragraph 2 below

International application No.
PCT/IB2004/052409 ✓

International filing date (day/month/year)
12.11.2004 ✓

Priority date (day/month/year)
17.11.2003

International Patent Classification (IPC) or both national classification and IPC
G09G3/34

Applicant
KONINKLIJKE PHILIPS ELECTRONICS, N.V. ✓

1. This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or Industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the international application
- Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/IB2004/052409

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - a sequence listing
 - table(s) related to the sequence listing
 - b. format of material:
 - in written format
 - in computer readable form
 - c. time of filing/furnishing:
 - contained in the international application as filed.
 - filed together with the international application in computer readable form.
 - furnished subsequently to this Authority for the purposes of search.
3. In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
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Box No. II Priority

1. The following document has not been furnished:

- copy of the earlier application whose priority has been claimed (Rule 43bis.1 and 66.7(a)).
- translation of the earlier application whose priority has been claimed (Rule 43bis.1 and 66.7(b)).

Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.

2. This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43bis.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.
3. It has not been possible to consider the validity of the priority claim because a copy of the priority document was not available to the ISA at the time that the search was conducted (Rule 17.1). This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.
4. Additional observations, if necessary:

Box No. IV Lack of unity of invention

1. In response to the invitation (Form PCT/ISA/206) to pay additional fees, the applicant has:

- paid additional fees.
- paid additional fees under protest.
- not paid additional fees.

2. This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is

complied with

not complied with for the following reasons:

see separate sheet

4. Consequently, this report has been established in respect of the following parts of the international application:

all parts.

the parts relating to claims Nos.

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

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**Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or
industrial applicability; citations and explanations supporting such statement**

1. Statement

| | | | |
|-------------------------------|------|--------|----------|
| Novelty (N) | Yes: | Claims | 1-17 |
| | No: | Claims | |
| Inventive step (IS) | Yes: | Claims | 1-11,16 |
| | No: | Claims | 12-15,17 |
| Industrial applicability (IA) | Yes: | Claims | 1-17 |
| | No: | Claims | |

2. Citations and explanations

see separate sheet

Re Item V.

- 1** The following documents are referred to in this communication:

D1 : US 6 531 997 B1 (GATES HOLLY G ET AL) 11 March 2003 (2003-03-11)
D2 : WO03079323 A1 (ZHOU ET AL) 25 September 2003 (2003-09-25)
D3 : WO 03/044765 A (E INK CORPORATION) 30 May 2003 (2003-05-30)
D4 : US 2002/005832 A1 (KATASE MAKOTO) 17 January 2002 (2002-01-17)

2 Clarity

Only the most important clarity problems will be addressed in this communication:

Claim 1 and 12: The term "over-reset" is vague. It is not clear whether the over-reset is an additional portion belonging to the reset portion or it is simply a potential applied during the standard reset portion.

Claim 1: The expression "to apply the driving portion.....to move the particles to a desired one of the intermediate optical states from one of the extreme optical states" is inconsistent with the description. It appears from the description that the driving portion is used to move the particles from one extreme optical state to an intermediate state or to the other *extreme state*.

3 Independent claim 1

- 3.1** The document D1 is regarded as being the closest prior art to the subject-matter of claim 1, and discloses (the references in parentheses applying to this document):

A display device comprising:

a display element;
a medium capable, upon imposition of a sequence of one or more potential differences, of changing its optical state from a first optical state to a second state, that can be the same as the first state (col. 2, lines 42-53);

a pixel electrode and a counter electrode associated with the display element and receiving the sequence of one or more potential differences (col. 26, lines 1-11 and fig. 9); and
a controller configured to determine and control the sequence of one or more potential differences imposed on the display element (col. 30, lines 55-59), the particles being at an extreme position when the display element is in one of the optical states (col. 2, lines 42-53),
the sequence of one or more potential differences comprising a reset (blanking) portion for enabling a change in the optical state of the display element to one of the extreme position (col. 28, lines 56-58), and a driving (addressing) portion for enabling a change in the optical state of the display element to one of the optical states (col. 28, lines 31-40),
the reset portion further comprising a standard reset portion and a balance portion (fig. 11 and col 28, lines 21-22 and 56-58),
the controller being further arranged to apply the reset portion to the display element (col. 30, lines 55-59), the balance portion being adjusted according to a distance that the particles in the medium move in order to achieve one of the two optical states (col. 28, lines 44-53) and to apply the driving portion to the display element to move the particles to a desired one of the two optical states (col. 28, lines 31-40).

3.2 From this the subject-matter of independent claim 1, as understood, differs in that:

The sequence of potential differences comprising a reset portion and a driving portion is applied to a display element with at least four optical states, two extreme optical states and at least two intermediate optical states and that the portion that is adjusted depending of the previous optical state of the pixel is the standard reset period instead of the balanced (over-reset) period.

The subject-matter of claim 1, as understood, is therefore novel (Article 33(2) PCT).

3.3 The problem to be solved by the present invention may be regarded as:

DC unbalanced waveforms applied to an electrophoretic display element with at least

four possible optical states during a period which starts and ends in the same optical state.

- 3.4 The solution to this problem proposed in claim 1, as understood, of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons:

The modification of the standard reset period (according to the distance of one of the four possible previous optical state of the pixel to an extreme optical state of the pixel) is compensated by the application of an over-reset period that maintains the DC balance during a period which starts and ends in the same optical state.

- 3.5 Claim 2-11 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

3.6 Independent claim 12

The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 12 does not involve an inventive step in the sense of Article 33(3) PCT.

- 3.7 The document D1 is regarded as being the closest prior art to the subject-matter of claim 12, and discloses (the references in parentheses applying to this document):

A method for updating an image on a bi-stable display, the method comprising:
determining a balance potential difference to be applied to a display element of the display taking into account a distance that particles of the bi-stable display must move to reach an extreme optical state of the display element (col. 28, lines 44-53);
applying the standard reset potential difference (blanking) to a display element of the bi-stable display (col. 28, lines 56-58),
applying a balance potential difference to the display element (col. 28, lines 44-53);
and
applying a driving potential difference to the display element corresponding to a desired optical state of the display element (col. 28, lines 31-40).

3.8 From this the subject-matter of independent claim 12, as understood differs in that:

The portion with variable voltage value determined according to the distance that the particles have to move to reach an extreme optical state is the balance portion, referred as "over-reset" portion in claim 12.

- 3.9 To modify the standard reset portion instead of the balance portion, both belonging to the sequence of potential differences to apply to the display elements according to the distance that the particles have to move to reach an extreme optical state is considered merely one of several straightforward possibilities from which the skilled person would select, in accordance with circumstances, without the exercise of inventive skill.**

3.10 Independent claim 17

Claim 17 refers to a program storage device tangibly embodying a program of instructions executable by a machine to perform a method the subject-matter of which corresponds to the subject-matter of claim 12 (see paragraph 3.6-3.9 above) The use of dedicated hardware or a combination of software and hardware to implement a driving method as the one described in claim 12 is considered to be a common practice in the field of displays and it does not imply the exercise of inventive skill. Therefore, the subject-matter of claim 17 does not involve an inventive step in the sense of Article 33(3) PCT.

4 Dependent claims 13, 14, 15

Dependent claims 13, 14 and 15 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step (Article 33(2) and (3) PCT).

Claim 13

D1 discloses a system where the standard reset portion (blanking) stays constant while the over-reset portion (balance) is modified. To modify the standard reset

portion or the over-reset portion to achieve the same effect is not considered to be inventive.

Claim 14

D1 discloses a method where the voltage applied during the balance portion is proportional to the distance that particles must move to reach an extreme optical state of the display element. To modify duration, instead of voltage is merely one of several straightforward possibilities from which the skilled person would select, in accordance with circumstances, without the exercise of inventive skill.

Claim 15

D2 discloses the effect provided by the application of the shaking pulses before the driving signal. The skilled person trying to eliminate image retention in a system performing the driving method described in D1 would make use of the teaching of D2 and would arrive to the subject-matter of claim 15.

5 Dependent claim 16

- 5.1 From the comparison of the disclosure of the prior art it follows that the following technical features of claim 16, which is dependent on claim 12, make a contribution over the prior art:

The application of additional shaking pulses during the standard reset portion at the time that the standard reset pulse is not applied.

- 5.2 From these, the objective problem to be solved can be construed as:

Lack of mobility of the charged particles presenting the same optical state for a long time.

- 5.3 The solution to this problem proposed in claim 16 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

International application No.
PCT/IB2004/052409

reasons:

No prior art document discloses or renders obvious the application of additional shaking pulses during the standard reset period, without increasing the time necessary to drive the pixels. Such an application reduces the image retention and therefore, increases the image quality.

Re Item IV.

- 1.1 The separate inventions/groups of inventions are:

Claims 1-11

Electrophoretic display being able to present at least four different optical states wherein the reset portion comprises: a standard reset portion that is adjusted according to the distance that the particles have to move to reach an extreme optical state, and an over-reset portion.

Claim 16

Application of additional shaking pulses during the time allocated to the standard reset period when the standard reset pulse is not applied.

- 1.2 The reasons for which the inventions are not so linked as to form a single general inventive concept, as required by Rule 13.1 PCT, are as follows:

- 1.3 Invention I:

From the comparison of the disclosure of the prior art (see Item V, paragraph 3.1) it follows that some technical features of claim 1 (see Item V, paragraph 3.2) make a contribution over the prior art and can be considered as a special technical feature within the meaning of Rule 13.2 PCT.

- 1.4 From these, the objective problem to be solved can be construed as:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

International application No.
PCT/IB2004/052409

See Item V, paragraph 3.3

1.5 Invention II:

From the comparison of the disclosure of the prior art (see Item V, paragraph 3.7-3.9) it follows that some technical features of claim 16 (see Item V, paragraph 5.1) make a contribution over the prior art and can be considered as a special technical feature within the meaning of Rule 13.2 PCT.

1.6 From these, the objective problem to be solved can be construed as:

See Item V, paragraph 5.2

1.7 In conclusion, the groups of claims are not linked by common or corresponding special technical features and define two different inventions not linked by a single general inventive concept.

The application, hence does not meet the requirements of unity of invention as defined in Rules 13.1 and 13.2 PCT.

1.8 Search has been carried out for the second invention without extra effort.